

# SIEMENS

## FUJI-Reader

**SP**

## Service Manual

### General Information

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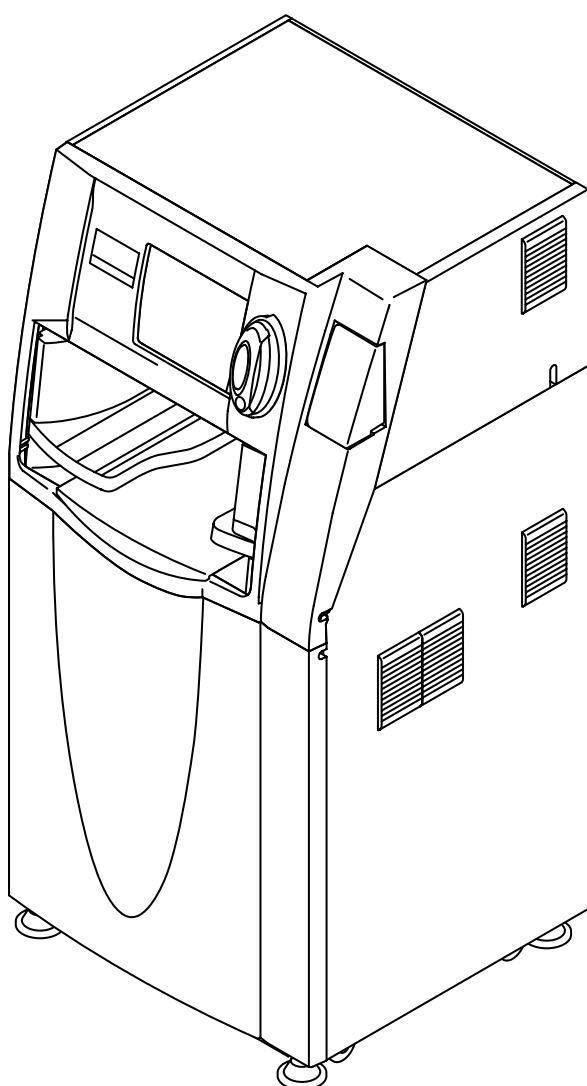
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FUJI COMPUTED RADIOGRAPHY

# CR-IR347 (FCR 5000MA) CR-IR347P (FCR 5000MA plus)

Service Manual



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Fuji Photo Film Co., Ltd.

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The relationship between mR (milliroentgen), which is the unit of radiation, and  $\mu\text{C/kg}$  (micro-coulomb/kilogram), which is the SI derived unit of radiation, is as follows.

$$1 \text{ mR} = 0.258 \mu\text{C/kg}$$

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# 1. Getting Started

## ■ Scope

This Service Manual is applicable to Fuji Computed Radiography CR-IR347 and CR-IR347P. The machine is categorized as Class 1 according to IEC classification.

### ◆ NOTES ◆

- Differences between the CR-IR347 and CR-IR347P are as follows.  
The CR-IR347 may be connected to the ID-T741.  
The CR-IR347P may be connected to the CR-IR348CL and ID-T741.
- Units with serial number #5001 or later are called "CR-IR347P".

## ■ Notation of Unit Symbols

For notation of unit symbols, metric units set forth in the International Systems of Units (SI) are used, as a rule. However, metric units that are allowed in the Measurement Law, not in the SI, are used in some cases.

## ■ Notation of Warnings, Cautions, etc.



### **WARNING**

*Used when death or serious injury may occur if the instruction is not observed.*



### **CAUTION**

*Used when minor or medium levels of physical injury may be incurred if the instruction is not observed.*

*Also used when the machine may suffer serious trouble (such as unrecoverable or difficult-to-recover trouble).*

### ◆ INSTRUCTION ◆

*Used when the machine may suffer damage, or any failure or malfunction may occur, if the instruction is not observed.*

### ◆ NOTE ◆

*Used to indicate the matters that need attention during steps of the procedure.*

### ◇ REFERENCE ◇

*Used to indicate terminology or supplemental explanations.*



Used to indicate the chapter or section you should refer to.

## ■ Notation in the Manual

In this service manual, the term "CR-IR347" represents the "FCR5000MA".

## ■ Notation of Symbols

- Check/Adjustment indicator: Indicates that it is necessary to check or adjust the installation location when the part or component removed is to be reinstalled.



This indicator is placed in the illustration that depicts the procedures for removing the parts and components.

When you see this indicator, refer to its relevant “■ Check/Adjustment Procedures.”

- Half-punch indicator:



Indicates that it is necessary to align the half-punches when installing the parts or components.

However, it is not indicated for the half-punches for improving ease of assembly or preventing erroneous assembly procedures.

## ■ Servicing Instruments and Tools That Require Inspection/Calibration

The machine should be installed and serviced by use of servicing instruments and tools that have been inspected and calibrated as appropriate.

If the machine were serviced using servicing instruments and tools that have not been inspected and calibrated, proper performance of the machine could not be guaranteed.

Servicing instruments and tools that require inspection/calibration are as listed below.

Inspection/calibration procedures should be performed in accordance with the inspection/calibration manuals described in the ECN Information.

### ● Instruments and tools that require inspection/calibration

Name	Inspection	Calibration	Servicing instrument inspection/calibration manual No.
Dosimeter	–	○	ECO NO. FCR - A014
Steel rule (150mm)	○	–	
Steel rule (300mm)	○	–	
Digital tester	○	○	
Calipers	○ (*)	–	
Push-pull gauge	○	○	

\*: A block gauge for use in inspection requires calibration.

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## 2. Safety Precautions

Warnings and cautions regarding the procedures should be observed to avoid possible physical hazards and serious accidents that may occur during installation and servicing.

Labels that describe relevant precautions are attached on the machine.

The instructions on such labels should also be observed during procedures.

### 2.1 Working Precautions

#### ■ Power Supply

- Unless otherwise instructed in the Service Manual, be sure to turn OFF the power of the machine and unplug the power plug before servicing. With the power plug still plugged, you may experience electric shock, burn, or secondary damage due to short circuit even when the machine is powered OFF. It should be noted, however, that some servicing procedures, such as voltage measurement, cannot be performed under power-OFF condition. In such cases, use due care to avoid electric shock, burn, or secondary damage due to short circuit, as instructed in this manual.
- To restart or reboot the machine, power it OFF and wait more than five seconds before powering it ON again. If the machine is powered ON within five seconds, it may automatically shut down for protection against overcurrent and overvoltage.

#### ■ Drive Mechanism

- Be sure to turn OFF the power before servicing the gears, cams, belts, and other drive mechanism parts. Otherwise, your body or clothing may be entangled.  
However, there may be cases where the procedures cannot be performed under power-OFF condition. In such cases, use due care to avoid entanglement of your hand, foot, hairs, and clothing with any rotating mechanism, as instructed in this manual.

#### ■ Heavy Objects

Exercise due care regarding your working posture to avoid back pain during removal and installation of heavy objects.

#### ■ Safety Devices

Safety devices (such as fuses, circuit breakers, interlock switches, panels, and covers) should always be enabled. Never attempt to make any alteration or modification that may impair their safety features.

## ■ Optical Parts

Observe the following rules when servicing the optical parts. Otherwise, the image quality may be degraded.

- Before removing the protective housings, be sure to turn OFF the high-voltage switch (HV switch). If the machine is powered ON with any of the protective housings removed, the photomultiplier will be damaged.
- Never remove the scanning optics unit covers. If the covers are removed, the image quality may degrade.
- For dust removal procedures, observe the instructions described in the manual.
- Some high-voltage parts, such as the photomultiplier, may not be sufficiently discharged even after power is turned OFF. When servicing such parts, exercise due care to avoid electric shock hazards (not to touch the connector and terminal carelessly).

## ■ Other Working Precautions

- Do not remove or install any part or component while the machine is powered, because of possible electric shock hazards.
- When performing checks or adjustments under the powered condition, exercise due care against electric shock or other hazards.
- Do not touch the parts (such as erasure lamps) that remain at high temperature because you may suffer burns.
- When servicing the scanning optics unit and printed circuit boards, be sure to wear an antistatic wristband to remove static electricity built on the human body. Static electricity may cause damage to the printed circuit boards.
- Secure the machine onto the floor in place by use of its adjustable feet or retainers.
- Keep clean the product labels, safety standards labels, product serial number indications, and so forth attached on the machine, and do not peel them or put another label over them.
- Before powering ON the machine after completion of the servicing procedures, make sure that all the parts, screws, connectors, and so forth that were removed have been reinstalled as appropriate, and that no tool is left in the machine.

## 2.2 Precautions Against Laser Radiation

As indicated by the Certification and Indication Label attached on the rear cover of the machine for overseas use, the machine complies with the U.S. Federal Regulations concerning laser safety. The image reader incorporates a laser with a maximum output of 60 mW (Class 3B, semiconductor laser wavelength of 660 nm, red visible light), but you will not be exposed to any hazard if you perform tasks as instructed in this manual.

### ■ Precautions Against Laser Exposure

Observe the following precautions to avoid laser exposure.

- Procedures that require precautions against laser exposure

When performing the following procedures, observe the instructions exactly as described in this manual to avoid laser exposure. After the procedures are completed, put the removed protective housings and screws back exactly in their original position to prevent leakage of a laser beam out of the machine.

- Removal and reinstallation of the scanning optics unit.
- Replacement and cleaning of subscanning unit parts.

- Preventive maintenance for keeping the machine in compliance

In order to keep the machine in compliance, perform preventive maintenance programs described in "Preventive Maintenance Volume" at intervals specified.

- Things that should not be done to avoid laser exposure

Observe the following precautions to avoid laser exposure.

- Never attempt to perform procedures other than instructed in this manual because you may be exposed to laser beam radiation.
- Do not reflect a laser beam by placing a mirror or the like in the laser beam path.
- Do not alter the light path of a laser beam.
- Do not replace optical parts while the laser is energized.
- Do not attempt to make optical axis adjustment in the field. Although the semiconductor laser beam is red visible light, field adjustment of the optical axis cannot be done.

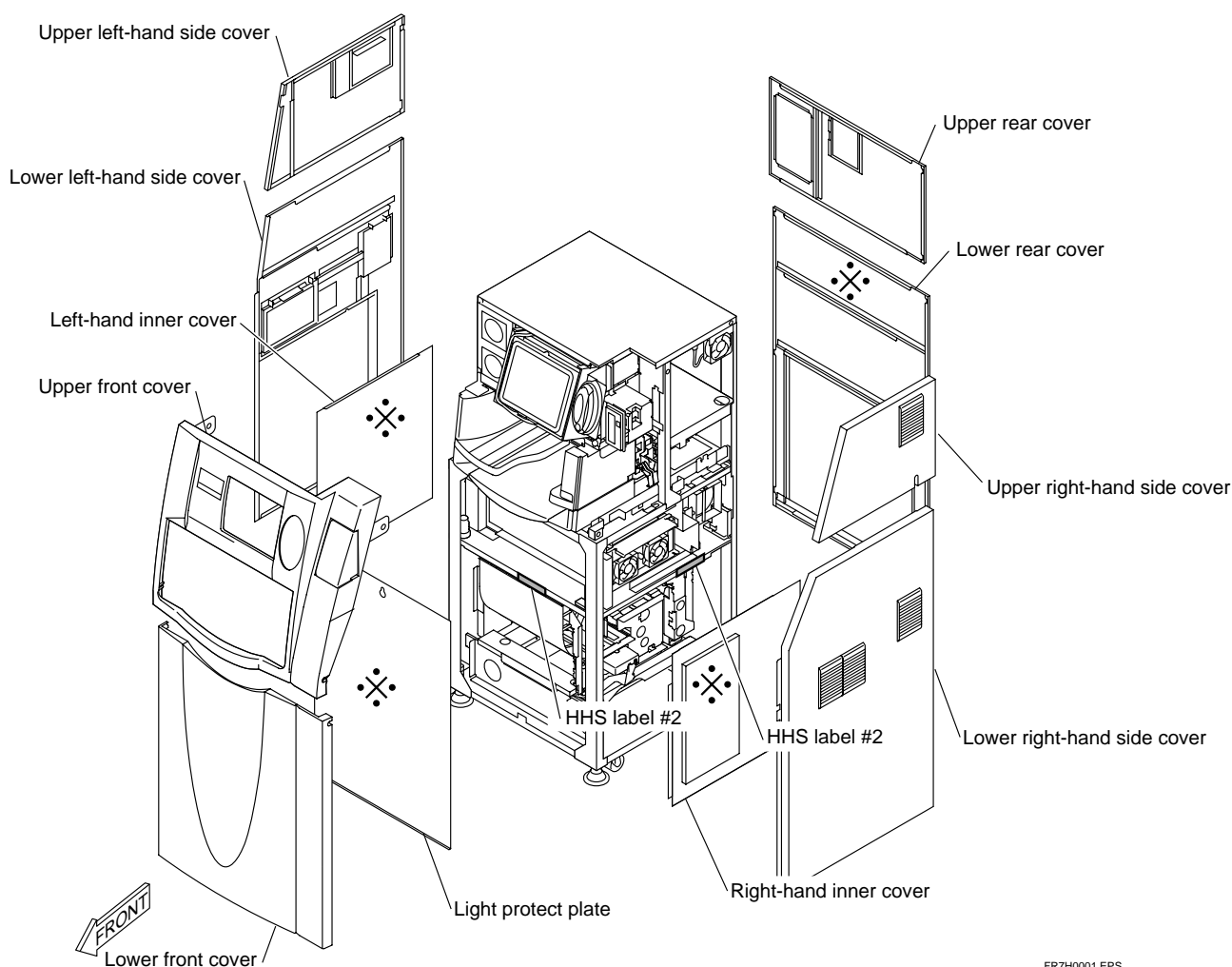


## ■ Protective Housings Against Laser Exposure

Even when the protective housings are removed for servicing, laser beams will never leak out from the machine unless the optical path is intentionally changed. However, if the optical path is changed inadvertently during optics-related procedures, the service engineer or other people around the machine may be possibly exposed to laser radiation. During optics-related procedures, carefully perform the procedures while checking the instructions described in this manual, and after the procedures are completed, restore the protective housings removed back exactly where they were.

### ● Protective Housing of the Machine

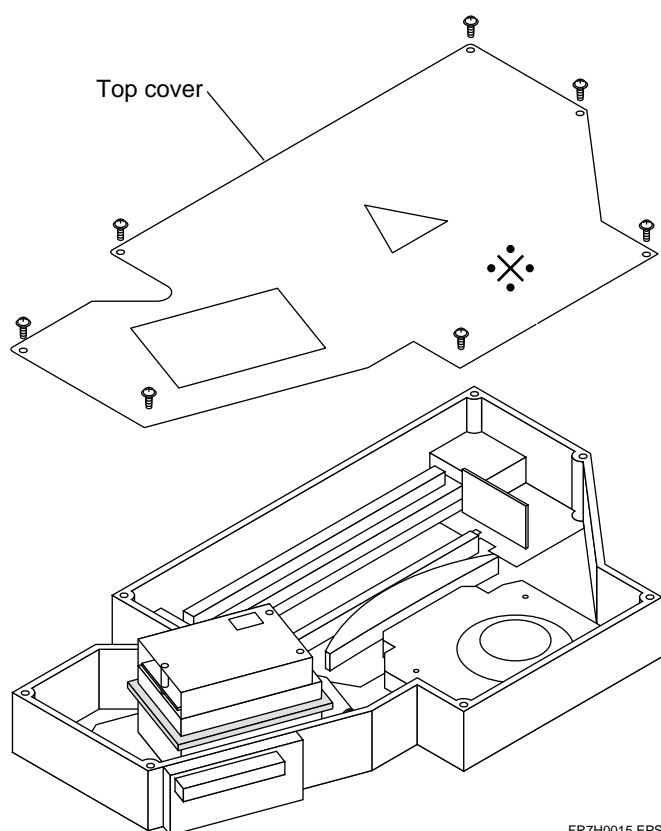
The removable protective housings of the machine are illustrated below. The four covers marked by ✖ in the illustration below are protective housings against laser exposure.



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## ■ Scanning optics unit protective housing

The removable protective housing for the scanning optics unit is shown below. The protective housing for laser radiation exposure prevention consists of the cover that is marked  $\otimes$  in the figure below.



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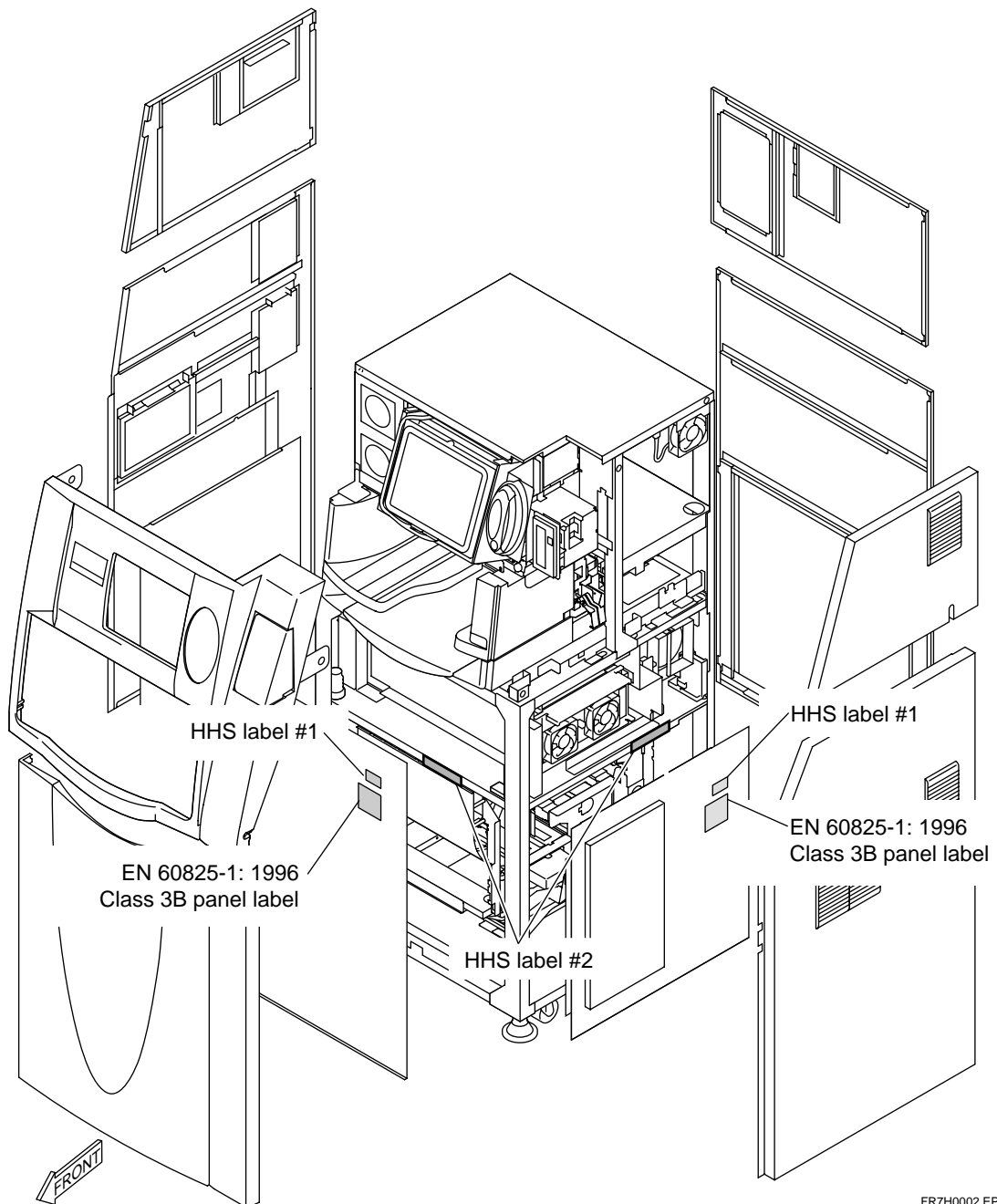
## 2.3 Safety Labels and Other Labels

### 2.3.1 Laser Precaution Labels

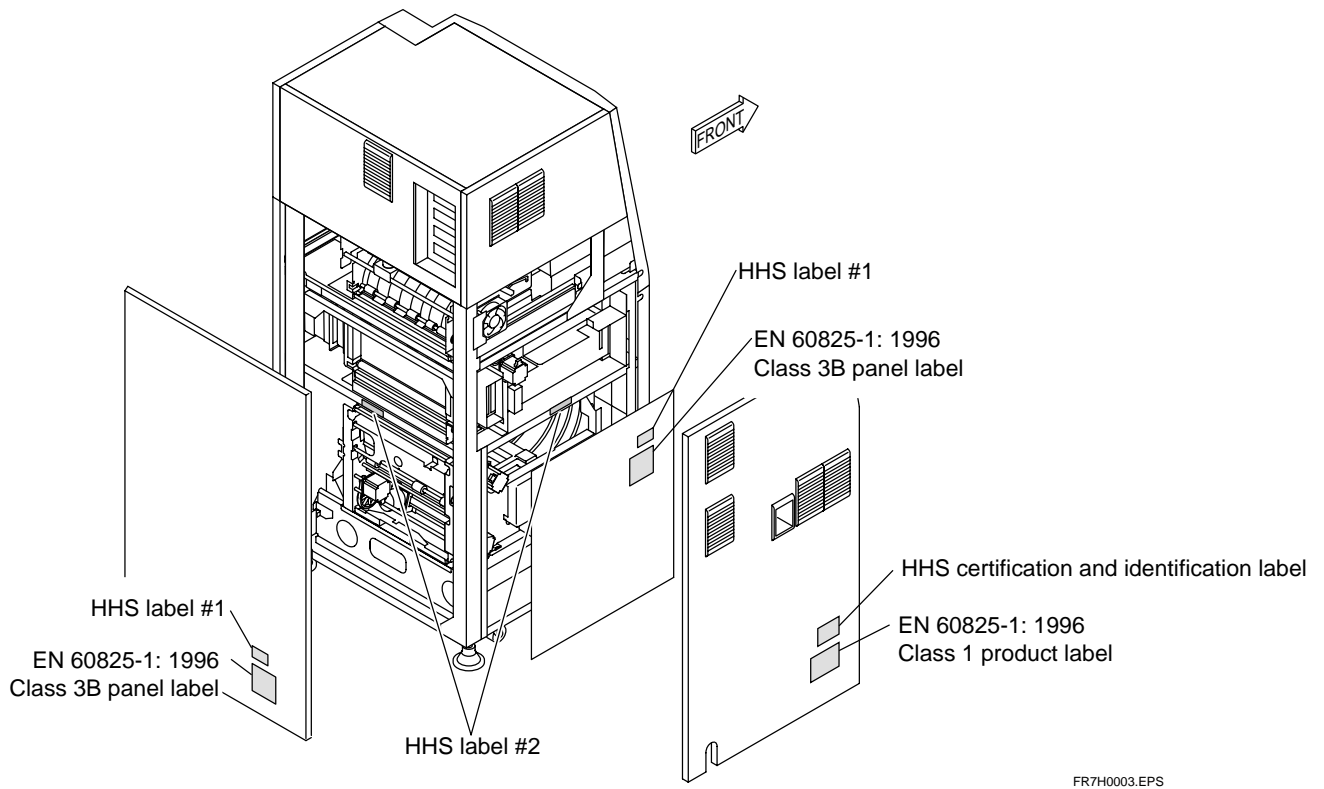
#### ■ Precaution Label Attachment Locations

Below are illustrated the protective housings and attachment locations of laser precaution labels, as specified in Part 1-J, Federal Regulations Code "Title 21" issued by the FDA of the U.S.

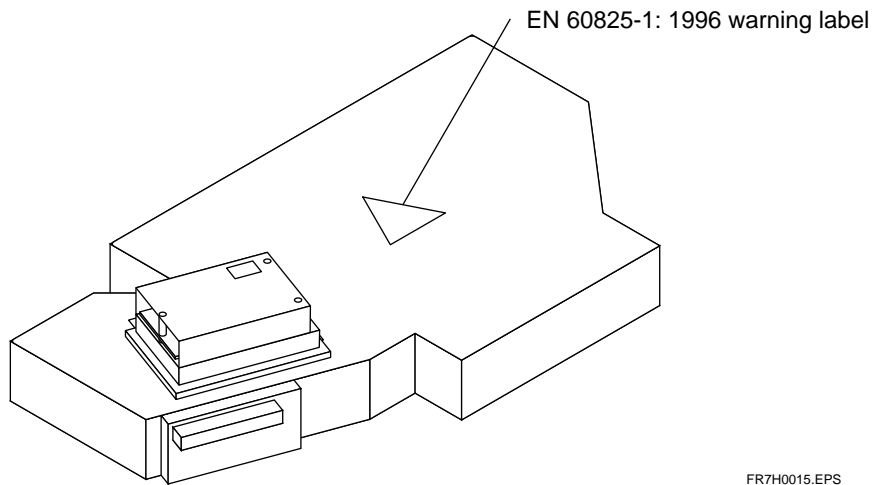
#### ● Machine



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## ● Scanning Optics Unit



## ■ List of Precaution Labels

### ● HHS Certification and Identification Label

#### CR-IR347



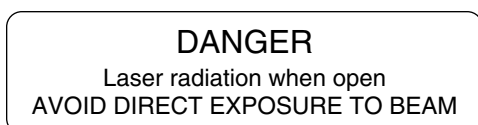
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#### CR-IR347P



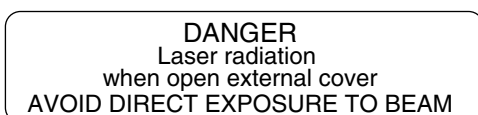
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### ● HHS Label #1



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### ● HHS Label #2



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### ● EN 60825-1: 1996 Class 1 Product Label



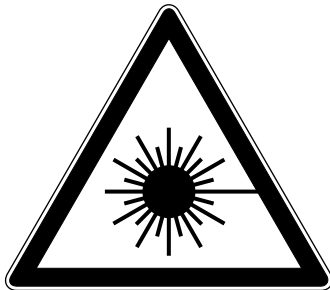
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### ● EN 60825-1: 1996 Class 3B Panel Label



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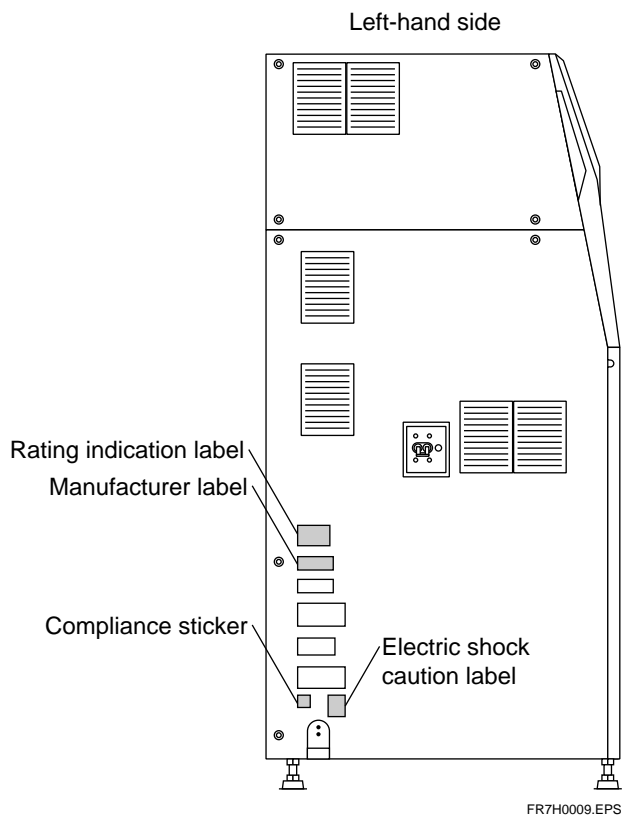
### ● EN 60825-1: 1996 Warning Label



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## 2.3.2 Other Labels

### ■ Label Attachment Locations

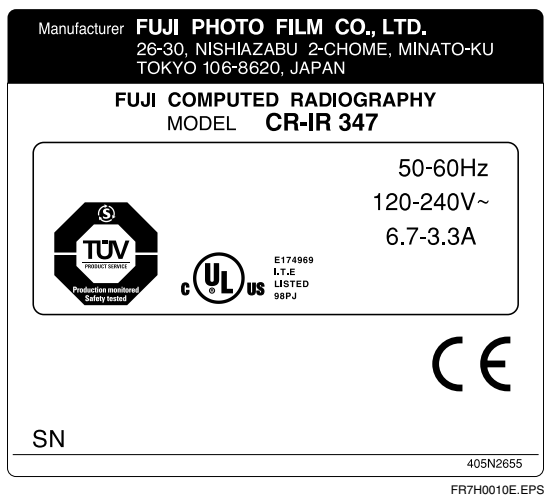




## ■ List of Other Labels

### ● Ratings Indication Label

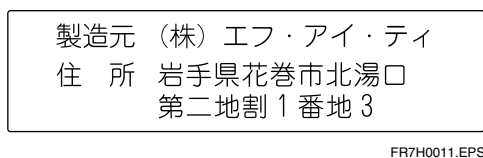
#### CR-IR347



#### CR-IR347P



### ● Manufacturer Label



### ● Compliance sticker



### ● Electric shock caution label

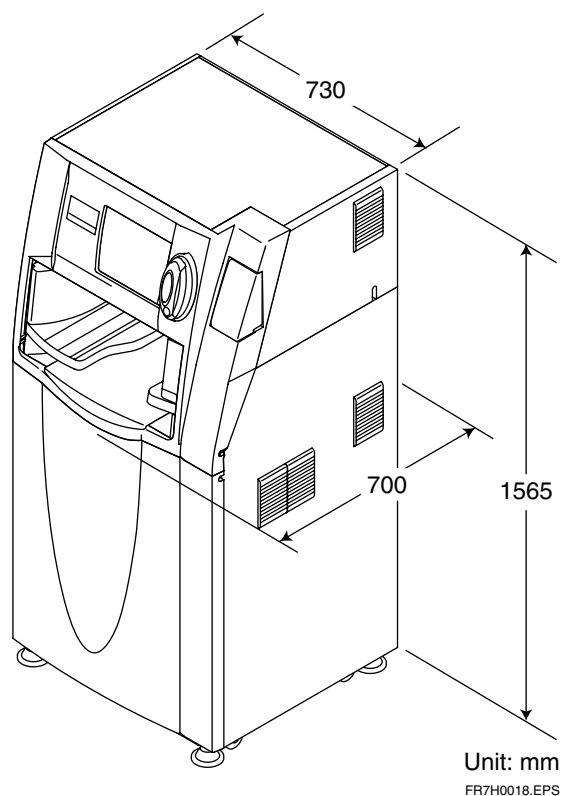


## 3. Specifications of the Machine

### 3.1 Dimensions, Weight, and Center of Gravity

#### ■ Dimensions

W730xD700xH1565 (mm)



#### ■ Weight

280 kg approx.

#### ■ Center of Gravity

Height: 720 mm

From the right-hand side: 365 mm

From the rear: 385 mm

## 3.2 Machine Moving and Fixing Means

### ■ Moving Means

- Caster x 4 (omnidirectional, no brake attached)

### ■ Fixing Means

- Adjustable foot x 4

## 3.3 Environmental Requirements

### ■ Atmospheric Requirements

	Operation	Non-operation	During transit
<b>Temperature</b>	15–30 °C	0–45 °C	-10–50 °C
<b>Relative humidity</b>	40–80 %	10–90 %	10–90 %
		(Without condensation)	
<b>Atmospheric pressure</b>	700–1,030 hPa	500–1,030 hPa	

The above environmental requirements during non-operation and during transit do not apply to IPs (Imaging Plates). TR7H0001.EPS

### ■ Floor (Installation Area) Vibration Requirements

10 to 55 Hz in frequency and 0.0075 mm or less in amplitude.

### ■ Floor Levelness

10 mm/m (1/100 of inclination) or less for both front and rear and both right and left

### ■ Floor Flatness

10 mm or less

### ■ Variable Magnetic Field

0.3 gauss p-p or less

## 3.4 Electrical Specifications

### ■ Frequency

50Hz/60Hz, single-phase, common specification

### ■ Line Voltage

120-240 VAC  $\pm 10\%$

### ■ Power Capacity

0.8 kVA

### ■ Power Cord

100 V: 3.5 m.

200 V: 15 m.

### ■ Rated Amperage

120-240 VAC, 50/60Hz: 6.7A-3.3A

### ■ Overload Protection

100 V/200 V: 15 A.

### ■ Power Consumption

0.8 kVA.

### ■ Grounding (Overseas)

Use a separate cable kit specifically designed for local use, and securely insert the power plug into an indoor polarized receptacle.

## 3.5 Other Specifications

### ■ Maximum Heat Generation

800 wh.

### ■ Noise

Standby: 55 dB or less.

Operation: 60 dB or less

Single-shot noise: 70 dB or less

### ■ Warm-up Time

Approx. 4 minutes.

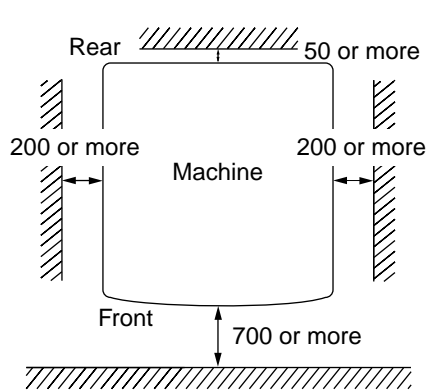
## 3.6 Installation and Servicing Spaces

### ■ Installation space requirements

The space required for installation varies depending on whether the machine is anchored.

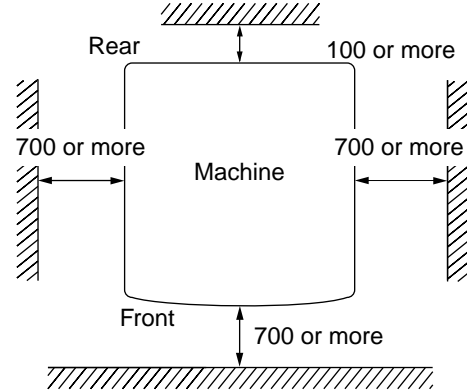
● When the machine is not anchored

Height: 1800 or more



● When the machine is anchored

Height: 1800 or more



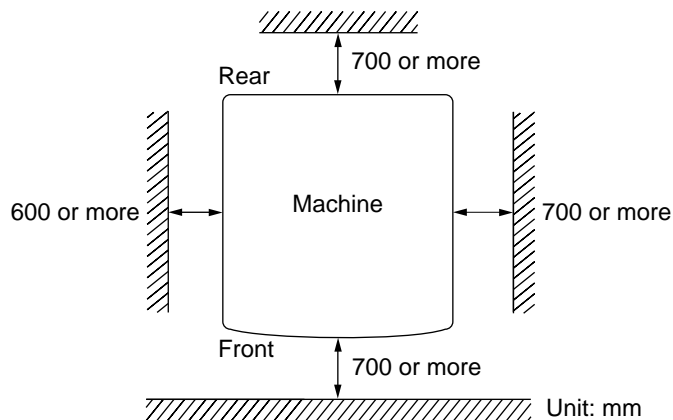
Unit: mm

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### ■ Servicing space requirements

Furnish the following space for servicing purposes.

Height: 1900 or more



Unit: mm

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## 3.7 Preliminary Work

Before starting the grounding procedures, make sure that the place where the machine is to be installed meets the criteria set forth in “SSS Installation Site Requirements.”

Before the machine is transferred, preinstallation procedures should be completed for necessary electrical utility, water supply/drain piping, waste solution disposal, and air-conditioning system installation work.

### ■ Electrical Work (Overseas)

For more detail, local rules and regulations should be complied with.

#### ● For 200V power supply

An independent branch circuit assigned specifically for the machine should be provided via a 15A circuit breaker.

A predetermined ground wiring should be implemented for the ground polarity of the receptacle.

#### ● For 100V power supply

A predetermined ground wiring should be implemented for the ground polarity of the receptacle.

### ■ Installation site conditions

Avoid the following installation sites:

- Places where the temperature changes drastically
- Places near heat sources such as heaters
- Places where water leakage or equipment submersion may occur
- Places where any corrosive gas may be generated
- Dusty places
- Places where the machine is subject to constant or excessive vibration/shock
- Places exposed to direct sunlight

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## 4. Notation of Board Names in Manual

Information about modifications to the boards installed in the machine is summarized here. Unless spelled out or enumerated in the manual, board names shall be replaced as follows.

Change to boards installed	Summary of change
MTH08C → MTH08D	<ul style="list-style-type: none"><li>● Features of the MTH08D board</li><li>• DIP switch (S1) was added.</li><li>• The fuse was changed to a replaceable glass tube type.</li><li>• The subject to be protected by the fuse was changed.</li></ul>
MMA90A → DIM08A MMB90A → DIM08A	<ul style="list-style-type: none"><li>● Features of the DIM08A board</li><li>• Memory module for the MTH08D board.</li><li>• The procedure for its removal/reinstallation was changed to horizontal detachment.</li><li>• Shipped as installed in the machine.</li></ul>
CPU90F → LAN90B	<ul style="list-style-type: none"><li>● Features of the LAN90B board</li><li>• To install the LAN90B board, it is necessary that the bracket located on the rear side of the controller be version D or later.</li></ul>

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